

## CLAIMS

What is claimed is:

1           1. An apparatus, comprising:  
2           a reflective element having a reflective surface; and  
3           an optical feed capable to receive a light signal and mounted to the  
4 reflective element, the optical feed positionable to direct the light signal onto the  
5 reflective surface of the reflective element, the reflective element shaped to  
6 reflect the light signal directed from the optical feed towards a remote location  
7 facing the reflective element.

1           2. The apparatus of claim 1 wherein the optical feed comprises an optic  
2 fiber extending out from the reflective element, the optic fiber having a terminal  
3 end, the optic fiber being configured to emit the light signal from the terminal end  
4 and to direct the light signal emitted from the terminal end onto the reflective  
5 surface of the reflective element.

1           3. The apparatus of claim 2 wherein the terminal end of the optic fiber  
2 resides adjacent to a focal plane of the reflective element.

1           4. The apparatus of claim 2 wherein the optical feed further comprises an  
2 endpoint element coupled to the terminal end of the optic fiber, the endpoint

element being capable to beam-form the emitted light signal or to wavelength filter the emitted light signal.

5. The apparatus of claim 1 wherein the optical feed is mounted to the reflective element via a mounting element adjustable about a plurality of axes.

6. The apparatus of claim 5 wherein the mounting element comprises a fiber positioner having a magnetic fluid cavity, the fiber positioner being capable to adjust a position and an orientation of the optical feed.

7. The apparatus of claim 6 wherein the positioner further includes a position sensor system being capable to provide feedback information to the fiber positioner.

8. The apparatus of claim 1 wherein the reflective element comprises a concave mirror.

9. The apparatus of claim 1, further comprising a plurality of optical feeds mounted to the reflective element.

10. The apparatus of claim 9, further comprising a light source to generate the light signal, the light source optically coupled to the plurality of optical feeds.

1           11. The apparatus of claim 1 wherein the reflective element is further  
2 capable to receive light sent from the remote location and to reflect this received  
3 light towards the optical feed to be received by the optical feed.

1           12. The apparatus of claim 11 further comprising an optical receiver  
2 coupled to the optical feed, the optical receiver capable to receive the light sent  
3 from the remote location.

1           13. An apparatus, comprising:  
2 a light emitter to emit a light signal; and  
3 a refractive lens assembly configured to receive the light signal emitted  
4 from the light emitter and to refract the light signal to a remote location facing the  
5 refractive lens assembly.

1           14. The apparatus of claim 13, further comprising:  
2 a support frame; and  
3 a mounting element to adjustably mount the light emitter to the support  
4 frame.

1           15. The apparatus of claim 14 wherein the light emitter comprises an  
2 optic fiber tip.

1           16. The apparatus of claim 15 wherein the support frame is curved to  
2 allow the optic fiber tip to be positioned adjacent to a focal plane of the refractive  
3 lens assembly.

1           17. The apparatus of claim 16 wherein the refractive lens assembly  
2 comprises a fisheye lens assembly.

1           18. The apparatus of claim 14 wherein the mounting element comprises a  
2 fiber positioner adjustable about a plurality of axes.

1           19. The apparatus of claim 18 wherein the fiber positioner is adjustable  
2 about five axes.

1           20. The apparatus of claim 15, further comprising a plurality of optic fiber  
2 tips each configured to direct their emitted light signal towards the refractive lens  
3 assembly.

1           21. The apparatus of claim 13 wherein the refractive lens assembly is  
2 further capable to receive light sent from a remote location and to direct this  
3 received light towards the light emitter, the light emitter further capable to receive  
4 this directed light.

1           22. The apparatus of claim 21 further comprising an optical receiver  
2 coupled to the light emitter, the optical receiver capable to receive the light sent  
3 from the remote location.

1           23. The apparatus of claim 13 wherein the light emitter comprises a  
2 uniform intensity generator having an input port optically coupled to receive the  
3 light signal and an output port to emit the light signal, the uniform intensity  
4 generator configured to emit the light signal with a uniform intensity distribution.

1           24. The apparatus of claim 23 wherein the uniform intensity generator  
2 comprises a transmitter having a first diffractive optical element and a second  
3 diffractive optical element, the first diffractive optical element to convert an input  
4 light signal having a non-uniform intensity distribution to an output light signal  
5 having a uniform intensity distribution, the second diffractive optical element to  
6 correct a phase distortion in the output light signal output from the first diffractive  
7 optical element.

1           25. The apparatus of claim 24, further comprising a plurality of  
2 transmitters to emit a corresponding plurality of light signals to be received by the  
3 refractive lens assembly.

1           26. A method of optical communication, the method comprising:  
2 generating an optical signal;

3 coupling the optical signal to an optical feed;  
4 aiming the optical feed;  
5 emitting the optical signal from the optical feed; and  
6 reflecting the optical signal emitted from the optical feed towards an  
7 optical receiver.

1 27. The method of claim 26 wherein aiming the optical feed comprises  
2 adjusting the optical feed about a plurality of axes.

1 28. The method of claim 27 wherein reflecting the optical signal emitted  
2 from the optical feed comprises reflecting the signal off a concave mirror.

1 29. The method of claim 26, further comprising generating a plurality of  
2 optical signals and reflecting these optical signals emitted from a corresponding  
3 plurality of optical feeds towards corresponding optical receivers.

1 30. A method of optical communication, the method comprising;  
2 generating an optical signal;  
3 coupling the optical signal to an optical waveguide;  
4 aiming the optical waveguide;  
5 emitting the optical signal from the optical waveguide; and  
6 refracting the optical signal emitted from the waveguide.

1           31. The method of claim 30 further comprising receiving the refracted  
2 signal with an optical receiver.

1           32. The method of claim 31 further comprising receiving the refracted  
2 signal with a plurality of optical receivers.

1           33. The method of claim 30, further comprising:  
2 generating a plurality of optical signals;  
3 coupling the plurality of optical signals to a plurality of optical waveguides;  
4 and  
5 refracting the plurality of optical signals emitted from each optical  
6 waveguide.

1           34. The method of claim 33, further comprising receiving the plurality of  
2 refracted optical signals with a plurality of corresponding optical receivers.

1           35. The method of claim 30 wherein refracting the optical signal emitted  
2 from the waveguide comprises directing the optical signal emitted from the  
3 waveguide into a fisheye lens assembly.